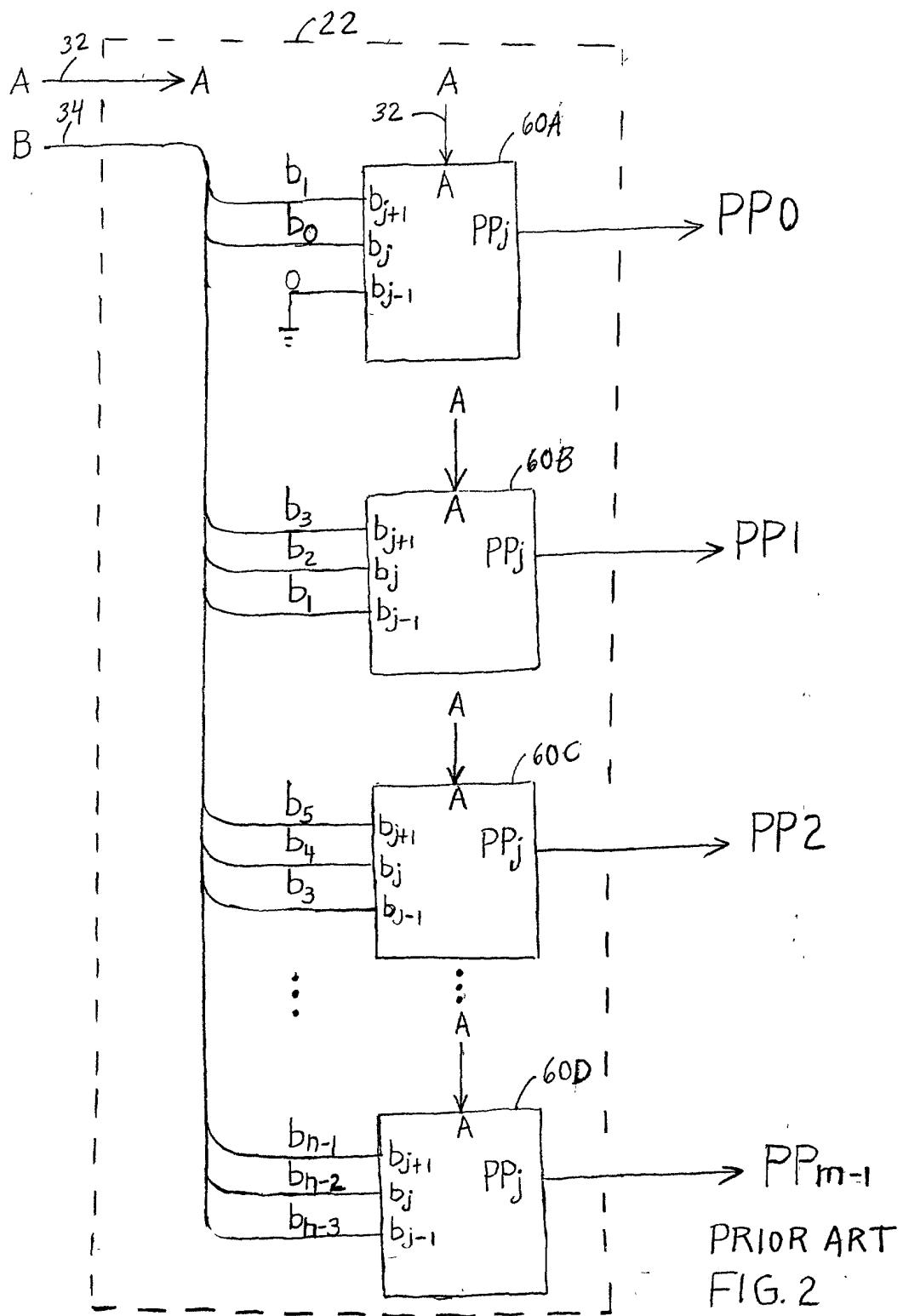


FIG. 1 PRIOR ART



60

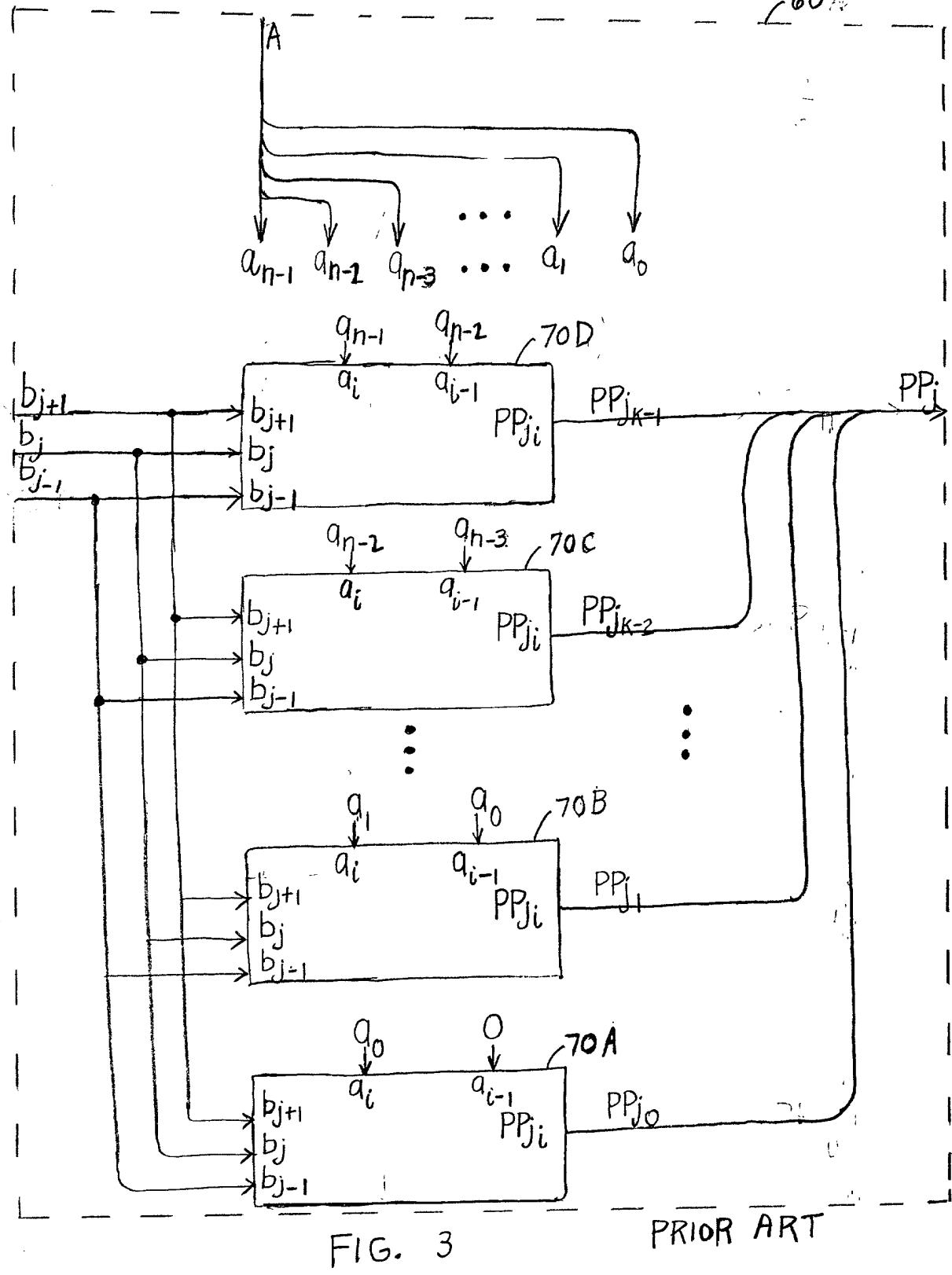


FIG. 3

where
 $X_1 = b_j \oplus b_{j-1}$

FIG. 4A PRIOR ART

eq. (2)

$$X_2 = \overline{b_{j+1}} b_j b_{j-1} + b_{j+1} \overline{b_j} \overline{b_{j-1}}$$

eq. (3)

$$N = b_{j+1}$$

eq. (4)

$$PP_{j,i} = (a_i X_1 + a_{i-1} X_2) \oplus N$$

eq. (1)

FIG. 4B PRIOR ART

b_{j+1}	b_j	b_{j-1}	X_1	X_2	N	$PP_{j,i}$	PP_j
0	0	0	0	0	0	0	0
0	0	1	1	0	0	a_i	A
0	1	0	1	0	0	a_i	A
0	1	1	0	1	0	a_{i-1}	$2A$
1	0	0	0	1	1	$\overline{a_{i-1}}$	$-2A$
1	0	1	1	0	1	$\overline{a_i}$	$-A$
1	1	0	1	0	1	$\overline{a_i}$	$-A$
1	1	1	0	0	1	0*	0*

see note (1) see note (1)

Note (1) In practice for the case of $b_{j+1} b_j b_{j-1} = 1, 1, 1$, the partial product bit $PP_{j,i}$ is frequently set equal to 1, in accordance with eq. (1), and therefore the partial product PP_j is equal to $1, \dots, 1$. However, the net effect of the partial product bit $PP_{j,i}$ and the partial product PP_j to the adder 24 is 0 because a sign bit of 1 is added to the LSB of the partial product PP_j during compressing in the adders.

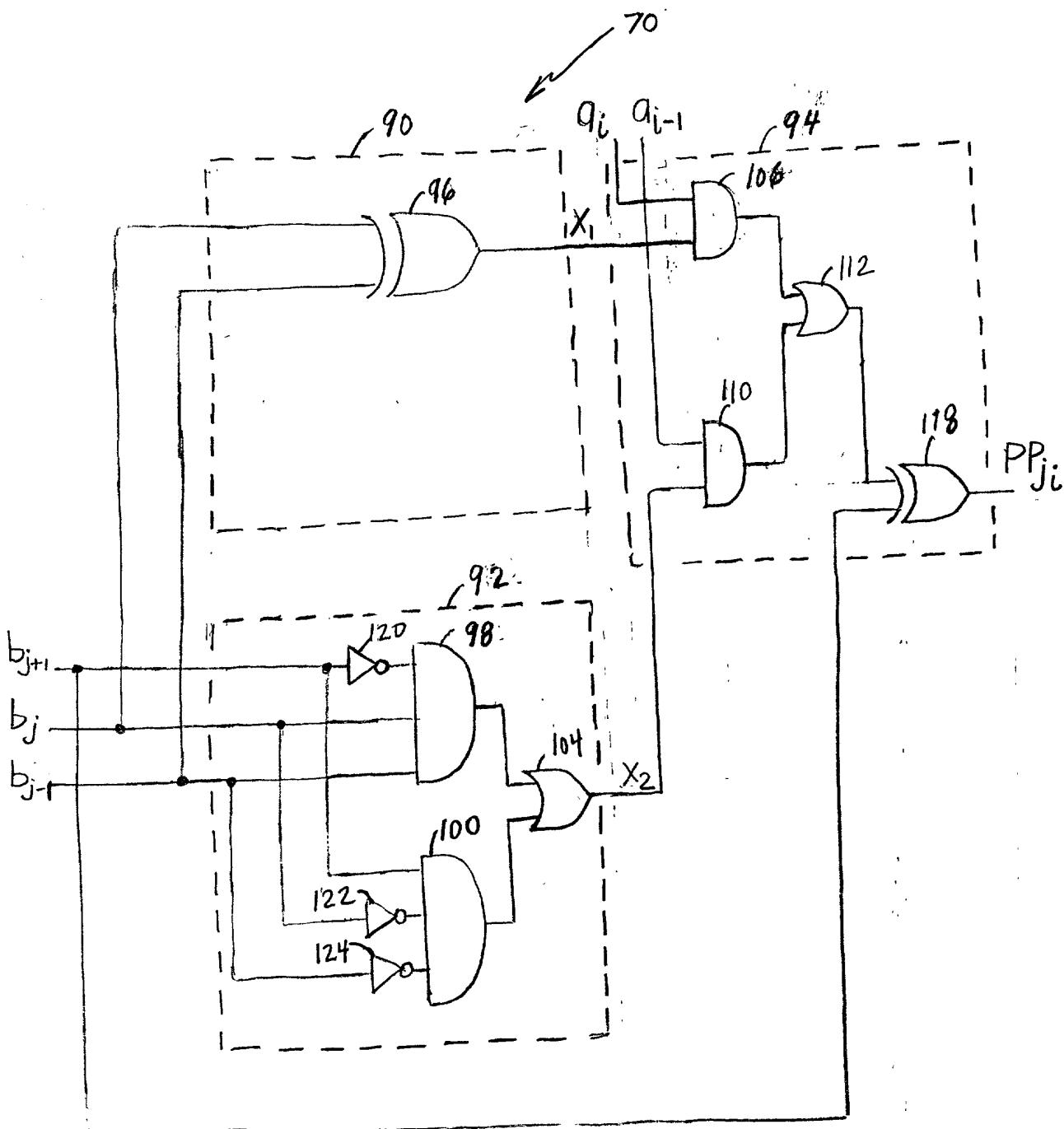


FIG. 5A PRIOR ART

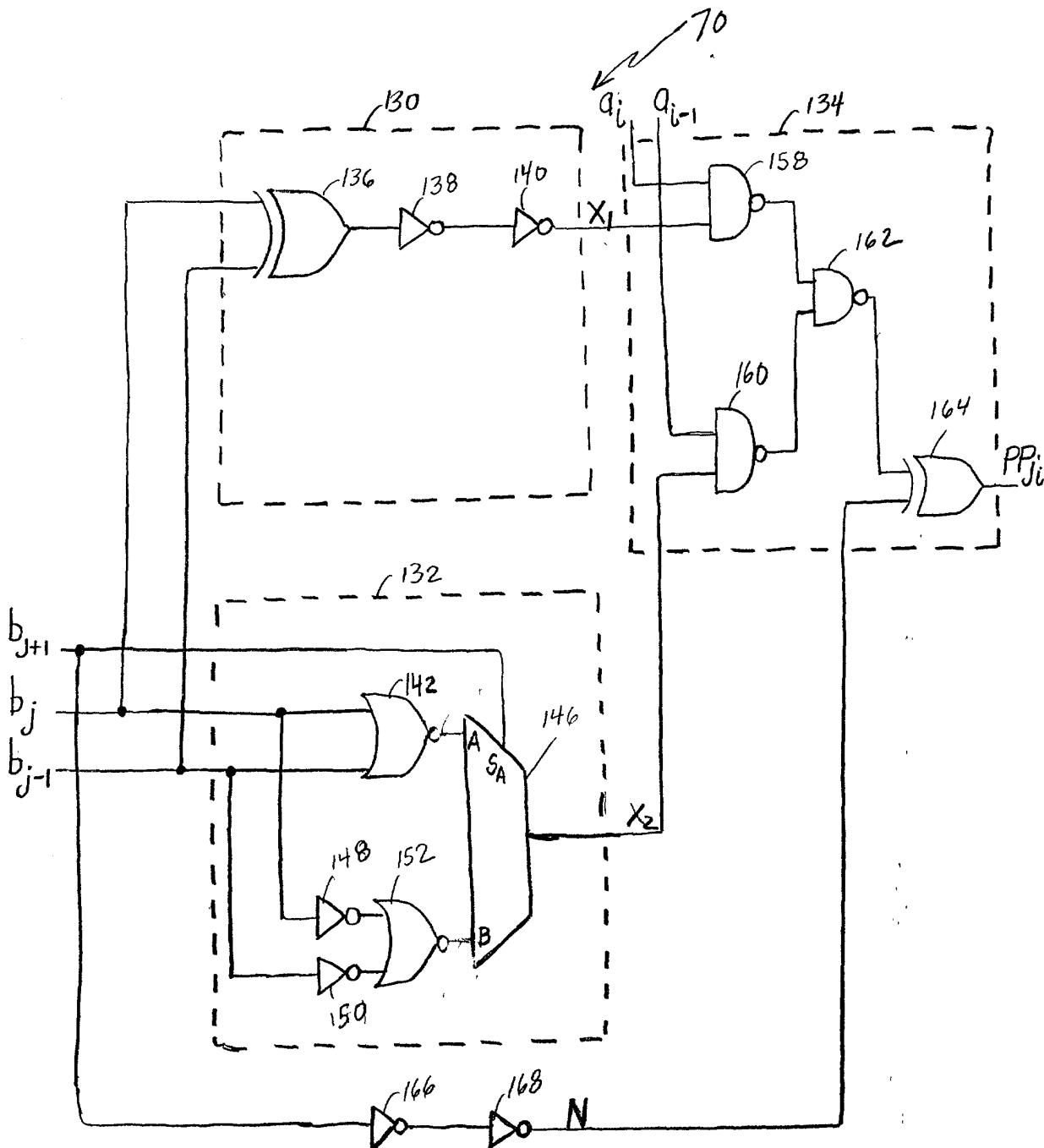


FIG. 5B PRIOR ART

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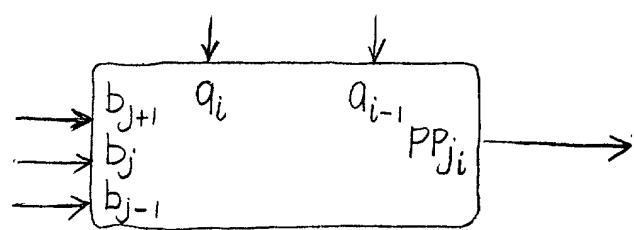


FIG. 6

where

$$S_{1,-1} = b_j \oplus b_{j-1}$$

FIG. 7A

eqn. (6)

$$S_2 = b_j b_{j-1}$$

eqn. (7)

$$S_{-2} = \overline{b_j} \overline{b_{j-1}}$$

eqn. (8)

$$qa_{1,-1} = a_i \oplus \overline{b_{j+1}}$$

eqn. (9)

$$qa_2 = a_{i-1} \overline{b_{j+1}}$$

eqn. (10)

$$qa_{-2} = \overline{a_{i-1}} \overline{b_{j+1}}$$

eqn. (11)

$$PP_{ji} = S_{1,-1} qa_{1,-1} + S_2 qa_2 + S_{-2} qa_{-2}$$

eqn. (5)

FIG 7B

b_{j+1}	b_j	b_{j-1}	$S_{1,-1}$	S_2	S_{-2}	$qa_{1,-1}$	qa_2	qa_{-2}	PP_{ji}	PP_{ji}^H
0	0	0	0	0	1	a_i	a_{i-1}	0	0	0
0	0	1	1	0	0	a_i	a_{i-1}	0	a_i	A
0	1	0	1	0	0	a_i	a_{i-1}	0	a_i	A
0	1	1	0	1	0	a_i	a_{i-1}	0	a_{i-1}	2A
1	0	0	0	0	1	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_{i-1}}$	-2A
1	0	1	1	0	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_i}$	-A
1	1	0	1	0	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_i}$	-A
1	1	1	0	1	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	0	0

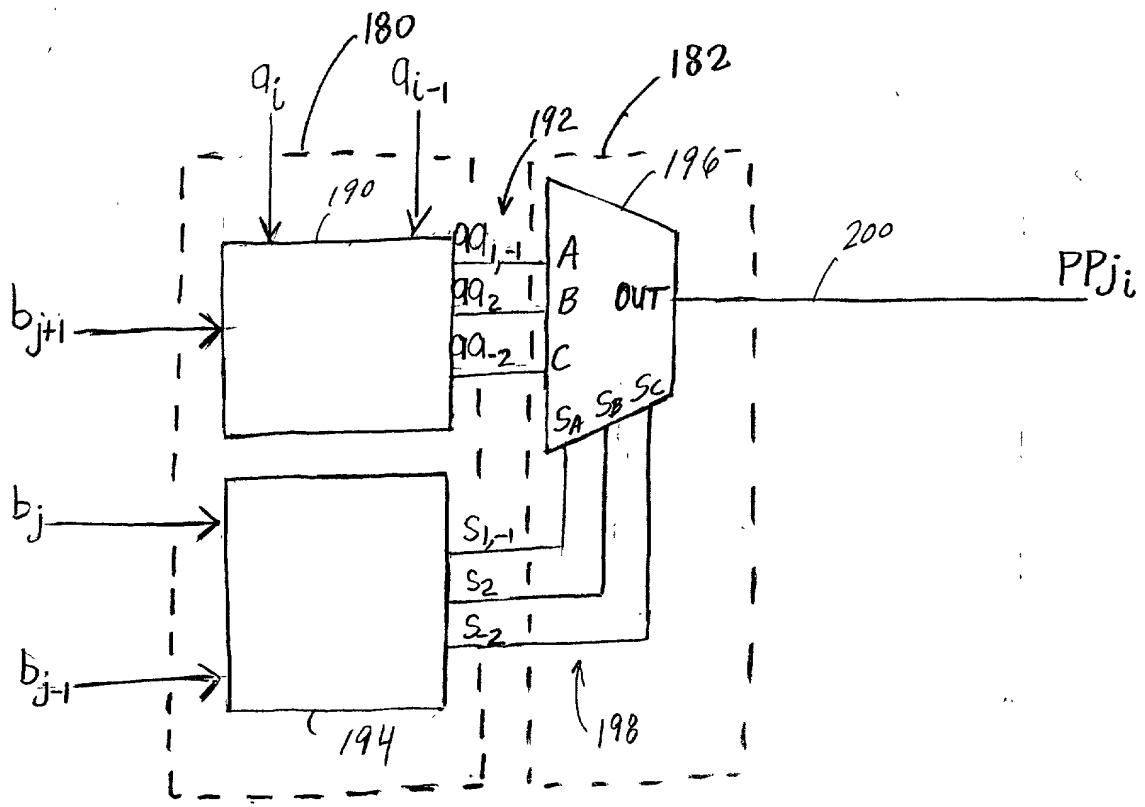


FIG. 8

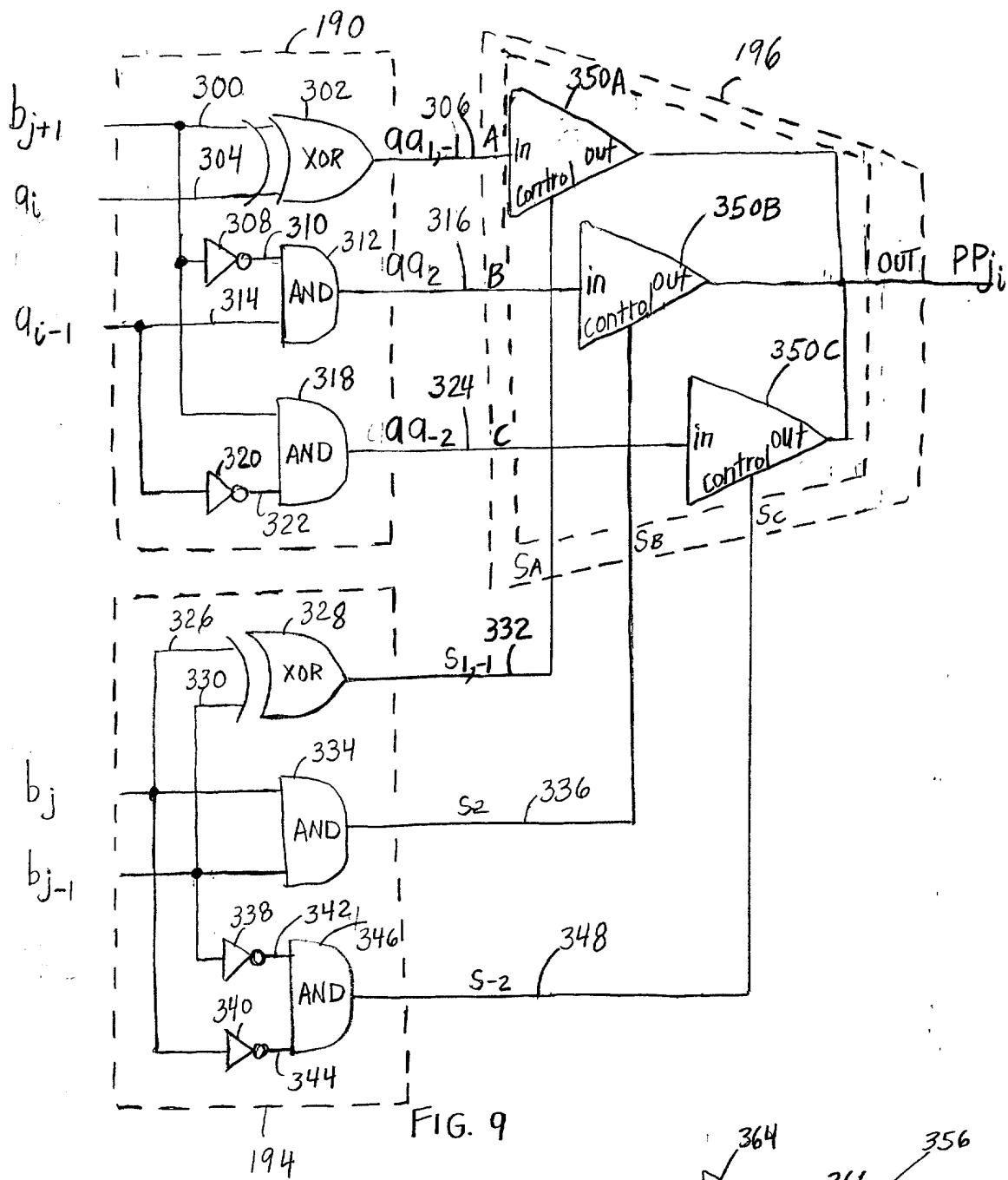
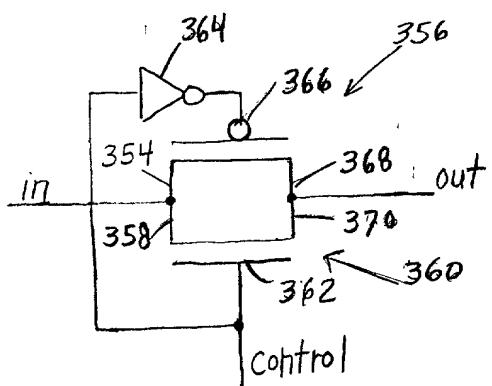


FIG. 9

FIG. 10



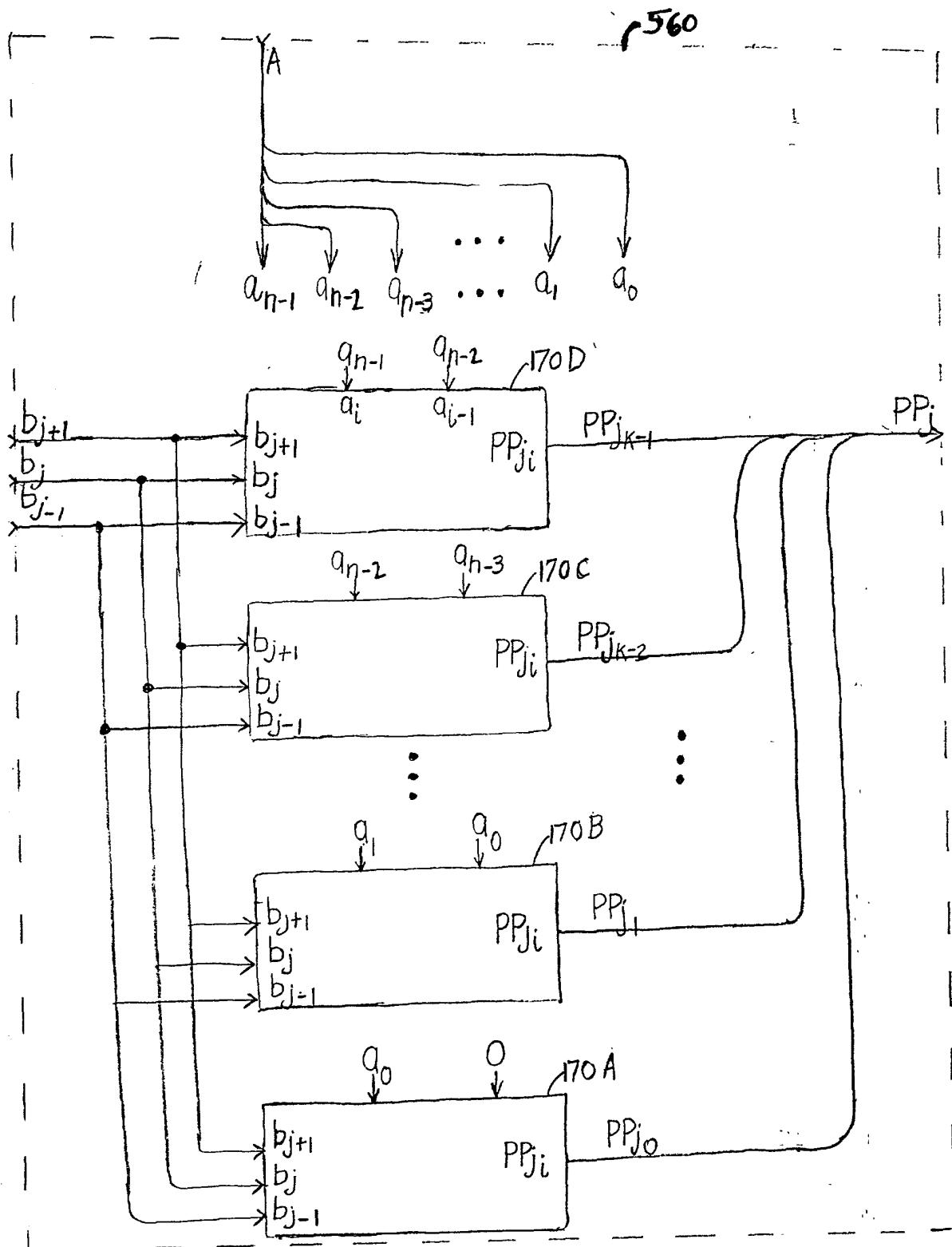


FIG. 11

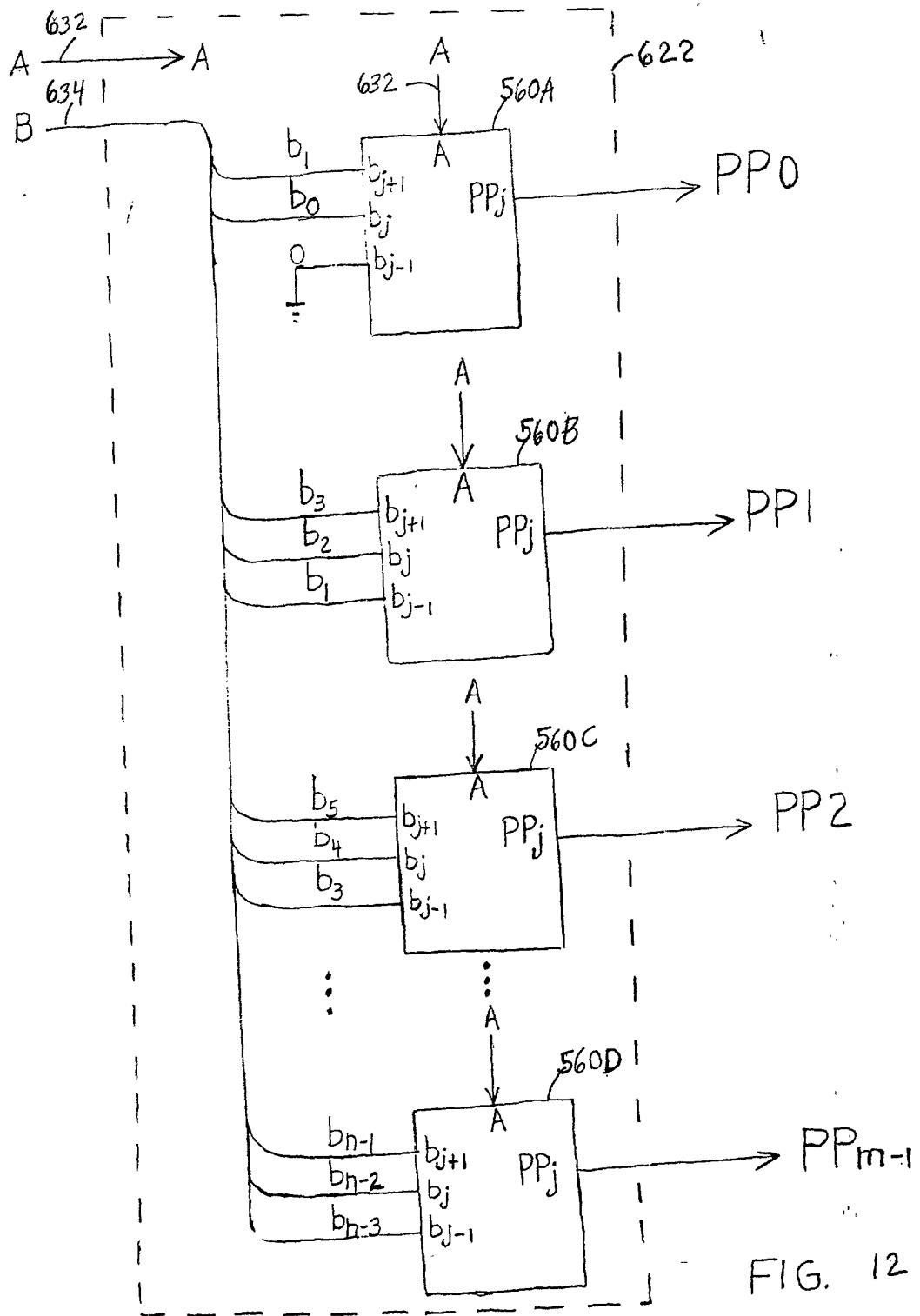


FIG. 12

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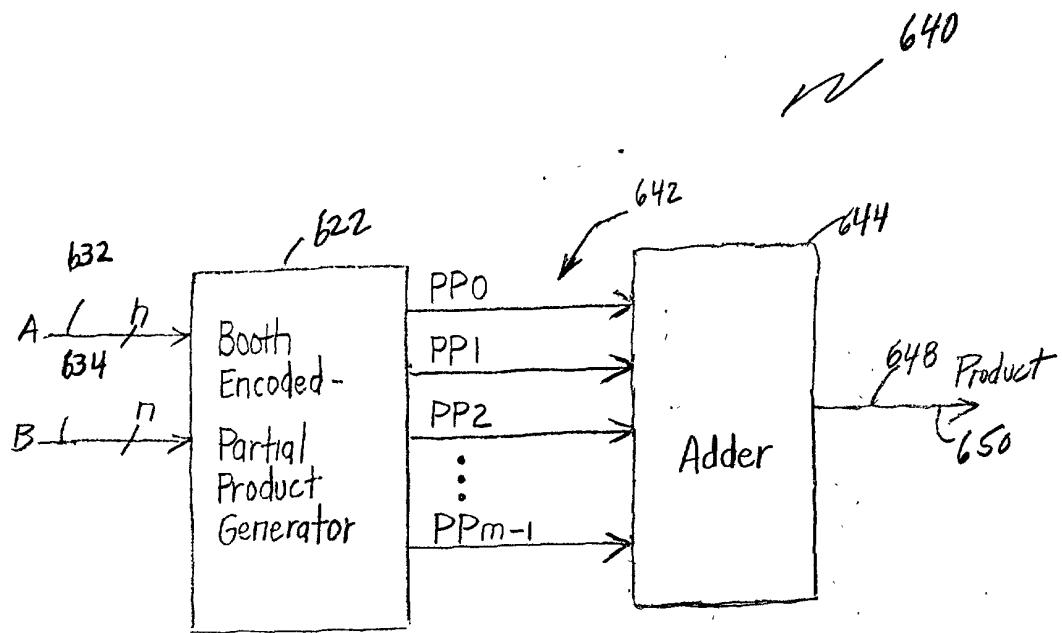


FIG. 13.